

SHOBHIT NIRWAN's
DESIGNED



CHEMICAL REACTIONS & EQUATIONS

NEW NOTES FOR CLASS 10 2022 EXAMS

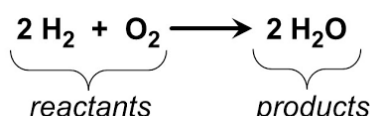
**Including PYQs in MCQ Format
NCERT Activities
Flowchart**

Chemical reaction

A process in which one or more substances react to form new substances(s) with new chemical identity and property.

Chemical Equation

A chemical equation is the symbolic representation of a chemical reaction. Symbols and formulae of the reactants and products are used for the same.



In words- Hydrogen + Oxygen ----> Water; called **Word Equation**.

Balanced Chemical Equation:

A chemical equation in which the number of atoms of each element on reactant side is equal to that of product side. Balancing of chemical equation is done to follow the law of conservation of mass('mass can neither be created nor be destroyed during a chemical reaction').

The method used for balancing chemical equations is called hit and trial method(i.e. Jugaad) as we make trials to balance the equation by using the smallest whole number coefficient.



Lallu Problem (L.P.) : Balance: $\text{Fe} + \text{H}_2\text{O} \longrightarrow \text{Fe}_3\text{O}_4 + \text{H}_2$

Step 1: Check the number of atoms of each element on the reactants and products side of the equation :

Elements	No. of atoms in Reactants side	No. of atoms in products side
Fe	1	3
H	2	2
O	1	4

Step 2: First of all, to balance oxygen atoms we multiply H_2O molecules by 4.



Step 3: Once again check the number of atoms of each element on both sides.

Elements	LHS	RHS
Fe	1	3
H	8	2
O	4	4

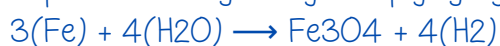
Step 4: Balancing Hydrogen atom by multiplying H₂ with 4 (∴ 4H₂ → 8 atoms)



Now,

ELEMENTS	LHS	RHS
Fe	1	3
H	8	8
O	4	4

Step 5: Balancing Fe by multiplying by 3 on LHS



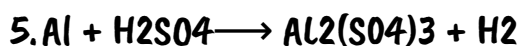
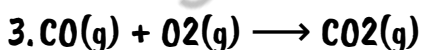
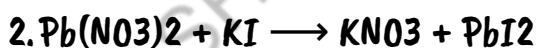
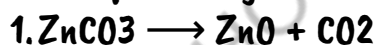
We can see,

ELEMENTS	LHS	RHS
Fe	3	3
H	8	8
O	4	4

Hence the equation is balanced!



L.P. : Some equations you should practice balancing: (Most likely equations)



1. Already Balanced (LOL!)



Kuch Kaam Ki Baat (K³B) :

PRECIPITATE:- An insoluble substance is called precipitate (ppt)

NCERT ACTIVITY

(AASAN BHASHA MEI)

Burning of a magnesium ribbon in air and collection of magnesium oxide in a watch-glass

Activity 1.1

CAUTION: This Activity needs the teacher's assistance. It would be better if students wear eye protection.

- Clean a magnesium ribbon about 2 cm long by rubbing it with sandpaper.
- Hold it with a pair of tongs. Burn it using a spirit lamp or burner and collect the ash so formed in a watch-glass as shown in Fig. 1.1. Burn the magnesium ribbon keeping it as far as possible from your eyes.
- What do you observe?

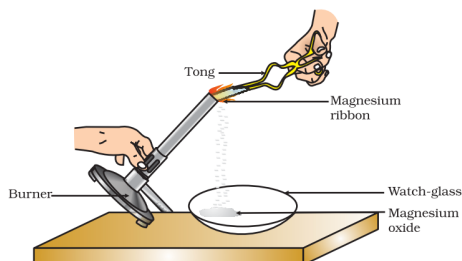


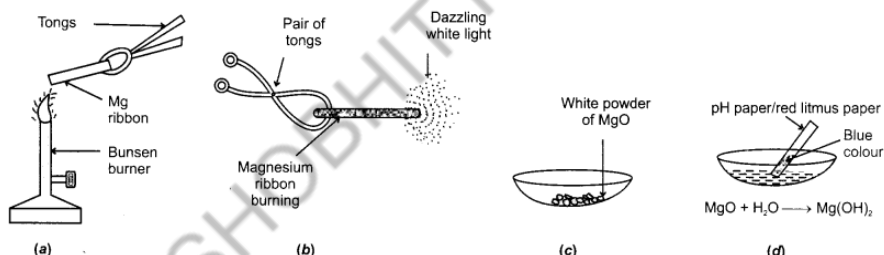
Figure 1.1
Burning of a magnesium ribbon in air and collection of magnesium oxide in a watch-glass



Chalo Ab Ise AASAN BHASHA MEI Samajhte hai :

- Take about 2 cm long magnesium ribbon .
- Clean it with sand paper.
- Hold the magnesium ribbon with a pair of tongs , and start heating its other end.
- The Magnesium Ribbon starts burning.
- BUT IT'S NOT BURNING ALONE.
- It starts burning with a **WHITE DAZZLING FLAME** .

And now to collect the Magnesium Oxide Powder hold it over a Watch Glass



Q: Why Magnesium ribbon is cleaned before burning in the air ?

Ans: The magnesium ribbon which we use usually has a coating of 'magnesium oxide' on its surface which is formed by the slow action of oxygen of air on it. So, before burning in air, the magnesium ribbon is cleaned by rubbing with a sand paper. This is done to remove the protective layer of magnesium oxide from the surface of magnesium ribbon so that it may readily combine with the oxygen of air (on heating).

Q: Why the magnesium ribbon should be burned by keeping it as far as possible from the eyes?

Ans: The dazzling (very bright) white light given out during the burning of magnesium ribbon is harmful to the eyes. So, the magnesium ribbon should be burned by keeping it as far as possible from the eyes.

CHARACTERISTICS OF A CHEMICAL REACTION

- Change in (i) Colour eg: $\text{Fe} + \text{CuSO}_4 \text{ (blue)} \rightarrow \text{FeSO}_4 \text{ (Blue Green)} + \text{Cu}$
(ii) Temperature eg: $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2 + \text{Heat}$
(iii) State eg: $\text{H}_2\text{(g)} + \text{O}_2\text{(g)} \rightarrow \text{H}_2\text{O(l)}$
Gas \rightarrow to \rightarrow Liquid
- Evolution of gas: eg: $\text{Zn(s)} + \text{H}_2\text{SO}_4 \text{ (aq)} \rightarrow \text{ZnSO}_4\text{(aq)} + \text{H}_2\text{(g)}$
- Formation of precipitate: eg: $\text{Pb(NO}_3)_2 \text{ (aq)} + \text{KI (aq)} \rightarrow \text{PbI}_2\text{(s)} + \text{KNO}_3\text{(aq)}$
(yellow solid ppt)
- Endothermic Reactions: Reactions in which energy is absorbed.
eg: $\text{CaCO}_3 + \text{Heat} \rightarrow \text{CaO} + \text{CO}_2$
or $\text{CaCO}_3 \rightarrow \Delta \text{ CaO} + \text{CO}_2$ ($\Delta \rightarrow$ Heat symbol)
- Photosynthesis is also endothermic reaction.
- Exothermic Reactions: Reactions in which heat is released along with the formation of products eg: $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2 + \text{Heat}$
- Digestion is exothermic reaction, Respiration is exothermic.



Kuch Kaam Ki Baat (K³B) :

- It is not always necessary to mention the physical states and reaction conditions in a balanced chemical equation. So, we can leave that step until it is asked in the question.

NCERT ACTIVITY

(AASAN BHASHA MEI)

Formation of Precipitate

Activity 1.2

- Take lead nitrate solution in a test tube.
- Add potassium iodide solution to this.
- What do you observe?

Chalo Ab Ise AASAN BHASHA MEI Samajhte hai :

- (i) Take some lead nitrate solution in a test-tube (or a beaker).
- (ii) Add potassium iodide solution to it.
- (iii) A yellow precipitate of lead iodide is formed at once.
- (iv) A change in colour (from colourless to yellow) also takes place in this chemical reaction.

Question from SQP 2021 issued by CBSE:

- | | |
|----|---|
| 1. | Reema took 5ml of Lead Nitrate solution in a beaker and added approximately 4ml of Potassium Iodide solution to it. What would she observe? |
| | A. The solution turned red. |
| | B. Yellow precipitate was formed. |
| | C. White precipitate was formed. |
| | D. The reaction mixture became hot. |

ans- B

NCERT ACTIVITY

(AASAN BHASHA MEI)

Chemical Reactions that evolve Gases AND Rise In Temperature

Activity 1.3

- Take a few zinc granules in a conical flask or a test tube.
- Add dilute hydrochloric acid or sulphuric acid to this (Fig. 1.2).
- CAUTION:** Handle the acid with care.
- Do you observe anything happening around the zinc granules?
- Touch the conical flask or test tube. Is there any change in its temperature?

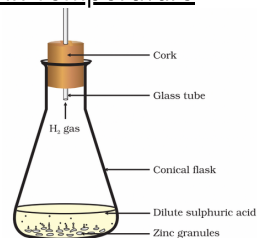
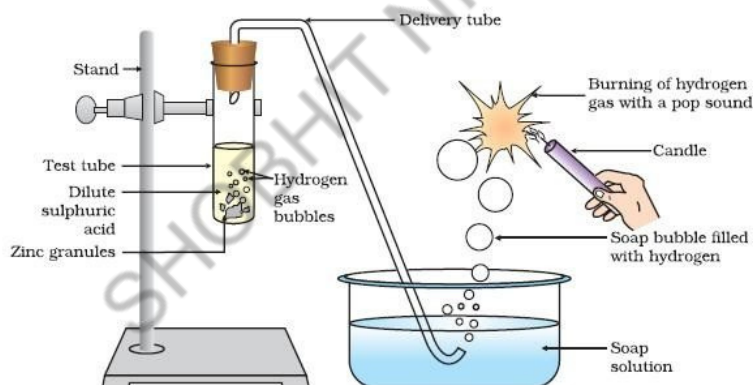


Figure 1.2
Formation of hydrogen gas by the action of dilute sulphuric acid on zinc

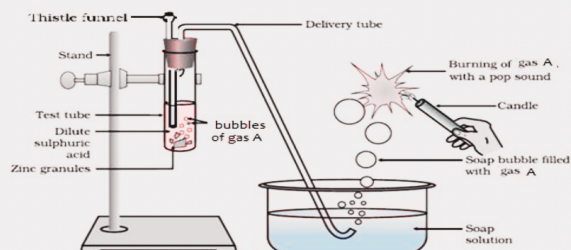
Chalo Ab Ise AASAN BHASHA MEI Samajhte hai :

- (Take some Zinc Granules in a Conical Flask)
- Now on Adding the Sulphuric Acid you will See a Magic.
- As You will see the bubbles of HYDROGEN GAS forming around the zinc metal
- We verified that it is Hydrogen gas because its bubbles burnt with pop sound when passed through soap solution (As shown below diagram)
- Also, if we will touch the flask with our hands we will see that it is too HOT.
- So we get to know that along with evolution of gas temperature also rises in the Chemical Reactions.



Question from SQP 2021 issued by CBSE:

2. Identify gas A in the following experiment.



- A. Nitrogen
- B. Hydrogen
- C. Oxygen
- D. Carbon dioxide

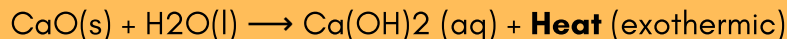
ans- B

Types of Chemical reaction

1. COMBINATION REACTION:

In a combination reaction, two or more reactants combine to give a single product.

eg:- 1. Quick Lime reacts with water to form slaked lime.



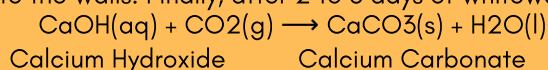
Calcium Oxide
(quick lime)

Calcium Hydroxide
(slaked lime)

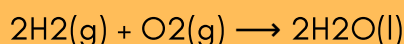


Kuch Kaam Ki Baat (कूँब):

Solution of calcium hydroxide (slaked lime) is used for whitewashing walls. Calcium hydroxide reacts slowly with CO₂ in the air to form a thin layer of calcium carbonate, on the walls which give a shiny appearance to the walls. Finally, after 2 to 3 days of whitewashing, calcium carbonate is formed

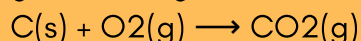


eg:- 2. Formation of water from hydrogen gas & oxygen gas:



Hydrogen Oxygen Water

eg:- 3. Burning of coal;



Carbon Oxygen Carbon Dioxide

2. DECOMPOSITION REACTION:

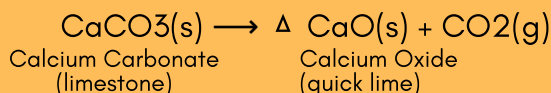
In a decomposition reaction, a single reactant breaks down into two or more simpler products (basically opposite of a combination reaction). Decomposition reactions are of 3 types:

(i) Thermal Decomposition :

These reactions use energy in the form of heat for the decomposition of the reactant

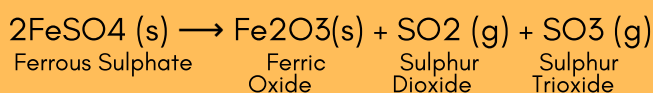
Examples :

a. Calcium carbonate on heating decomposes to give calcium oxide and carbon dioxide:



NOTE:- CALCIUM OXIDE IS USED FOR MANUFACTURING OF CEMENT

b. Ferrous sulphate the green colour crystals FeSO₄ • 7H₂O on heating lose water of crystallization and forms dehydrated FeSO₄ which on decomposition gives ferric oxide, sulphur dioxide SO₂ and sulphur trioxide SO₃. Ferric oxide is a solid while SO₂ and SO₃ are gases.



(SEE THE ACTIVITY FOR IT ON NEXT PAGE)



Kuch Kaam Ki Baat (K³B) :

The ferrous sulphate crystals which are available in a science laboratory are actually ferrous sulphate heptahydrate, $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$. They contain 7 molecules of water of crystallisation. These crystals are green in colour. When the green coloured ferrous sulphate heptahydrate crystals ($\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$) are heated, they first lose 7 molecules of water of crystallisation to form anhydrous ferrous sulphate (FeSO_4) which is white in colour. And then this anhydrous ferrous sulphate decomposes to give ferric oxide, sulphur dioxide and sulphur trioxide. In the above equation, we have written ferrous sulphate crystals without water of crystallisation just to keep the equation simple.

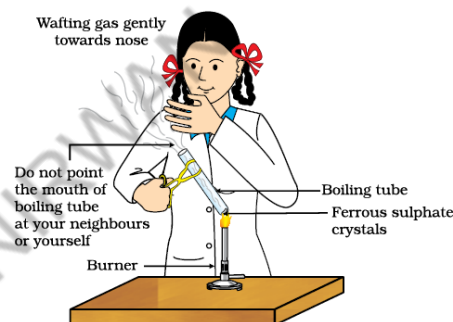
NCERT ACTIVITY

(AASAN BHASHA MEI)

Decomposition reaction of ferrous sulphate.

Activity 1.5

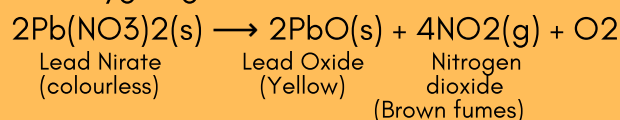
- Take about 2 g ferrous sulphate crystals in a dry boiling tube.
- Note the colour of the ferrous sulphate crystals.
- Heat the boiling tube over the flame of a burner or spirit lamp as shown in Fig. 1.4.
- Observe the colour of the crystals after heating.



Chalo Ab Ise AASAN BHASHA MEI Samajhte hai :

- Take about 2 grams of Ferrous Sulphate Crystals in a DRY Boiling Tube.
- They are originally Green In Colour
- Heat the boiling tube over a burner
- Now You will again see the magic.
- As the green colour first changes to White And then Finally a Brown Solid is formed(which is ferric oxide)
- So the main observation of this activity is that the smell of burning Sulphur comes out along with the colour change from Green to White and then Brown.

c. On heating lead nitrate, it decomposes to give yellow lead monoxide, nitrogen dioxide and oxygen gas.



(SEE ACTIVITY FOR THIS ON NEXT PAGE)

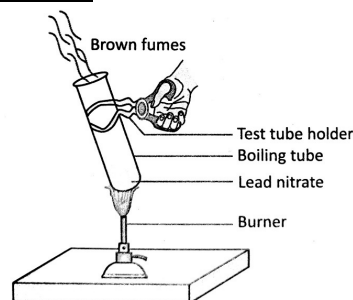
NCERT ACTIVITY

(AASAN BHASHA MEI)

Decomposition reaction of lead nitrate.

Activity 1.6

- Take about 2 g lead nitrate powder in a boiling tube.
- Hold the boiling tube with a pair of tongs and heat it over a flame, as shown in Fig. 1.5.
- What do you observe? Note down the change, if any.



Chalo Ab Ise AASAN BHASHA MEI Samajhte hai :

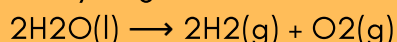
- Take about 2 grams of lead nitrate powder in a boiling tube. Lead nitrate is a colourless compound.
- Hold the boiling tube in a test-tube holder and heat it over a burner.
- Brown fumes of nitrogen dioxide gas are evolved which fill the boiling tube.
- If a glowing splinter is held over the mouth of the boiling tube, it catches fire and starts burning again. This shows that oxygen gas is also evolved during this reaction.
- A yellow solid is left behind in the boiling tube. This is lead monoxide (Please note that lead monoxide is reddish-brown when hot but yellow when cold).

(ii) Electrolytic Decomposition or Electrolysis:-

These reactions involve the use of electrical energy for the decomposition of the reactant molecules.

Examples:

a. When an electric current is passed through water, it decomposes to give oxygen and hydrogen



b. When an electric current is passed through molten sodium chloride, it decomposes to give sodium metal and chlorine gas.

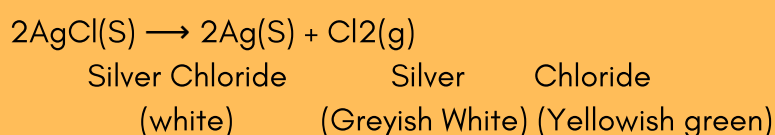


(iii) Photo Decomposition or Photosynthesis or Photochemical decomposition:

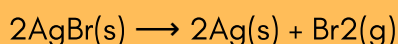
These reactions involve the use of light energy for the purpose of decompositions.

Examples:

a. When silver chloride is exposed to sunlight, it decomposes to give silver metal and chloride gas



b. Similarly, silver bromide gives silver metal and bromine gas in the presence of sunlight.



NOTE:- This reaction of Silver Halides are used in Black and White Photography.

(AASAN BHASHA MEI)

Activity 1.8

-
- The diagram shows a window with a yellow beam of sunlight passing through it. The word "Sunlight" is written in red inside the beam. Below the window, a white china dish sits on a wooden block. The dish contains a grey substance labeled "Silver chloride". A line points from the text "China dish" to the dish itself.

- Take about 2 grams of silver chloride in a china dish. It is white in colour.
- Place this china dish in sunlight for some time .
- We will find that white silver chloride turns greyish white (due to the formation of silver metal).
- Silver bromide also behaves in the same way as silver chloride with light energy.

(ACTIVITY FOR THIS IS BELOW)

NCERT ACTIVITY

(AASAN BHASHA MEI)

Displacement reaction between iron (nail) and copper sulphate solution.

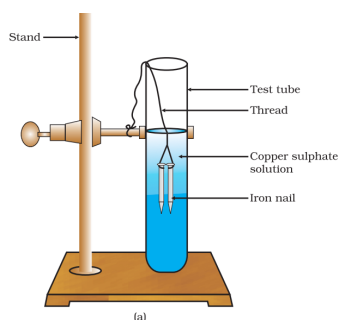


Figure 1.8
(a) Iron nails dipped in copper sulphate solution

Activity 1.9

- Take three iron nails and clean them by rubbing with sand paper.
- Take two test tubes marked as (A) and (B). In each test tube, take about 10 mL copper sulphate solution.
- Tie two iron nails with a thread and immerse them carefully in the copper sulphate solution in test tube B for about 20 minutes [Fig. 1.8 (a)]. Keep one iron nail aside for comparison.
- After 20 minutes, take out the iron nails from the copper sulphate solution.
- Compare the intensity of the blue colour of copper sulphate solutions in test tubes (A) and (B), [Fig. 1.8 (b)].
- Also, compare the colour of the iron nails dipped in the copper sulphate solution with the one kept aside [Fig. 1.8 (b)].

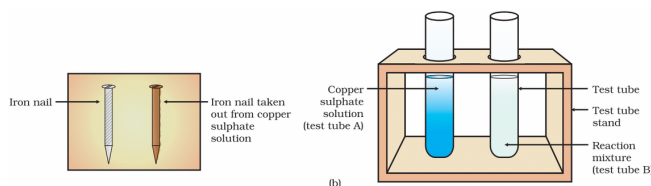


Figure 1.8 (b) Iron nails and copper sulphate solutions compared before and after the experiment

Chalo Ab Ise AASAN BHASHA MEI Samajhte hai :

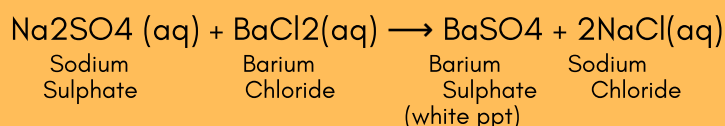
- Take about 10 mL of copper Sulphate solution in a test tube.
- Its original colour is Deep Blue
- Now take a big iron nail and clean it same like u did with Magnesium Ribbon using the sand paper.
- Now put the iron nail in the solution and then see the magic.
- After sometime like half an hour we will see that the iron nail would be covered with red-brown layer.
- And this layer would be of our another metal that is Copper.
- So Finally we will see that the original Deep blue colour has faded and the solution turns to light Green Colour.

(ii) Double displacement reaction:

The reaction in which two different ions or groups of atoms in the reactant molecules are displaced by each other is called a double displacement reaction. Also, called precipitation reaction as a precipitate is produced in such reactions

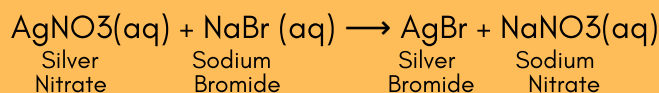
Examples -

a. On adding sodium sulphate to barium chloride a curdy white precipitate of barium sulphate and a solution of sodium chloride is formed:



(ACTIVITY FOR THIS ON NEXT PAGE)

b. On adding silver nitrate solution to sodium bromide, a yellow precipitate of silver bromide and solution of sodium nitrate is formed.

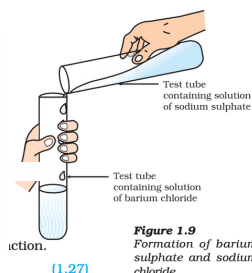


NCERT ACTIVITY (AASAN BHASHA MEI)

Double displacement reaction between barium chloride and sodium sulphate.

Activity 1.10

- Take about 3 mL of sodium sulphate solution in a test tube.
- In another test tube, take about 3 mL of barium chloride solution.
- Mix the two solutions (Fig. 1.9).
- What do you observe?



Chalo Ab Ise AASAN BHASHA MEI Samajhte hai :

- Take 3mL of Sodium Sulphate solution in a test tube .
- And take 3mL of Barium Chloride but in another test tube .
- Add Barium Chloride solution to Sodium Sulphate solution
- And the magic we see is now of White colour as a White Precipitate is left over in the Test Tube.

4. OXIDATION:

A substance (on the reactant side) is said to be oxidised if Oxygen is added

OR

Hydrogen is Removed from it after the reaction and the process is called oxidation

Eg:- $2\text{Cu} + \text{O}_2 \rightarrow 2\text{CuO}$ (Here Cu is oxidised due to addition of Oxygen)

NCERT ACTIVITY (AASAN BHASHA MEI)

Oxidation of copper to copper oxide

Activity 1.11

- Heat a china dish containing about 1 g copper powder (Fig. 1.10).
- What do you observe?



Chalo Ab Ise AASAN BHASHA MEI Samajhte hai :

- Take about 1 gram of copper powder in a china dish. It is redbrown in colour.
- Heat the china dish strongly over a burner (see Figure 55).
- A black substance is formed. This black substance is copper oxide

5. REDUCTION:

A substance (on the reactant side) is said to be reduced if Oxygen is removed

OR

Hydrogen is added to it after the reaction and the process is called reduction.

Eg:- $\text{H}_2 + \text{F}_2 \rightarrow 2\text{HF}$ (Here F_2 is reduced due to addition of hydrogen)

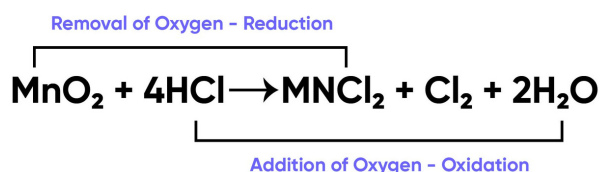
6. REDOX REACTION:

Reaction in which oxidation and reduction both take place simultaneously.

Also,

In a redox reaction substance getting oxidised is called a Reducing agent.

And, the substance getting reduced is called an Oxidising agent.

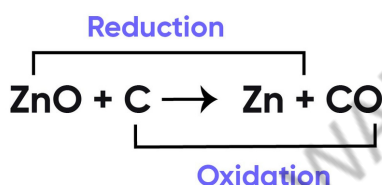


Here, MnO_2 is reduced to MnCl_2 (removal of oxygen)

HCl is oxidised to Cl_2 (removal of Hydrogen)

MnO_2 is an oxidising agent.

HCl is a reducing agent.



ZnO is reduced to Zn (removal of oxygen)

C is oxidised to CO (addition of oxygen)

ZnO is an oxidising agent

C is a reducing agent.

EFFECTS OF OXIDATION

1. CORROSION : जंग लगा लोहे में.

When a metal is attacked by substances around it such as moisture acid, air, water, etc. It is said to corrode & this process is called corrosion.

Eg:- Rusting of metal, blackening of silver, green coating on copper. It causes damage to bridges, iron railing, ships, car bodies and all objects made of metals (specially those which are made up of iron)

2. RANCIDITY:

Oxidation of fat and oils in the food items result in a change in the taste and smell. We say those food items are rancid and the process is called rancidity.

METHODS TO PREVENT RANCIDITY:-

- Packing of food items like potato wafers etc. in packets containing nitrogen gas instead of air. (eg - packed chips)
- Avoid keeping the cooked food and food materials in direct sunlight.
- Keeping food materials in air-tight containers.
- Refrigeration of cooked food.

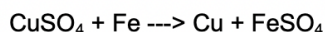
QUESTIONS FROM CBSE SQP 2021-22

4. Which of the following correctly represents a balanced chemical equation?

- A. $\text{Fe(s)} + 4\text{H}_2\text{O(g)} \rightarrow \text{Fe}_3\text{O}_4\text{(s)} + 4\text{H}_2\text{(g)}$
- B. $3\text{Fe(s)} + 4\text{H}_2\text{O(g)} \rightarrow \text{Fe}_3\text{O}_4\text{(s)} + 4\text{H}_2\text{(g)}$
- C. $3\text{Fe(s)} + \text{H}_2\text{O(g)} \rightarrow \text{Fe}_3\text{O}_4\text{(s)} + \text{H}_2\text{(g)}$
- D. $3\text{Fe(s)} + 4\text{H}_2\text{O(g)} \rightarrow \text{Fe}_3\text{O}_4\text{(s)} + \text{H}_2\text{(g)}$

Ans-B

6. In the reaction of iron with copper sulphate solution:



Which option in the given table correctly represents the *substance oxidised* and the *reducing agent*?

OPTION	Substance Oxidized	Reducing Agent
A	Fe	Fe
B	Fe	FeSO_4
C	Cu	Fe
D	CuSO_4	Fe

Ans-A

7. The chemical reaction between copper and oxygen can be categorized as:

- A. Displacement reaction
- B. Decomposition reaction
- C. Combination reaction
- D. Double displacement reaction

Ans-C

10. Why is it important to balance a skeletal chemical equation?

- A. To verify law of conservation of energy.
- B. To verify the law of constant proportion.
- C. To verify the law of conservation of mass.
- D. To verify the law of conservation of momentum.







Ans- C


32. **Assertion:** Decomposition of vegetable matter into compost is an endothermic reaction.
Reason: Decomposition reaction involves breakdown of a single reactant into simpler products.


A is False but R is true

PREVIOUS YEAR QUESTIONS

(Converted into MCQ format)

-  1. What change in the colour of iron nails and copper sulphate solution you observe after keeping the iron nails dipped in copper sulphate solution for about 30 minutes? (2010, 1M)
- A. Pinkish
B. Brownish
C. Reddish
D. Blackish
-  2. Why respiration is considered as Exothermic reaction? (2008, 2017, 1M)
- A. Because power is released during respiration
B. Because oxygen is taken in during respiration
C. Because energy is released during respiration.
D. Because energy is consumed during respiration.
-  3. Name a reducing agent that may be used to obtain manganese from manganese dioxide. (2009, 1M)
- A. HCL
B. HNO₃
C. NaCl
D. Fe
-  4. Balance the following reaction:
 $\text{Fe(s)} + \text{H}_2\text{O(g)} \rightarrow \text{Fe}_3\text{O}_4\text{(s)} + \text{H}_2\text{(g)}$ (1M, 2008)
- A. $2\text{Fe(s)} + 4\text{H}_2\text{O(l)} \rightarrow 3\text{Fe}_3\text{O}_4\text{(s)} + 4\text{H}_2\text{(g)}$
B. $\text{Fe(s)} + 4\text{H}_2\text{O(l)} \rightarrow 4\text{Fe}_3\text{O}_4\text{(s)} + 4\text{H}_2\text{(g)}$
C. $3\text{Fe(s)} + 4\text{H}_2\text{O(l)} \rightarrow \text{Fe}_3\text{O}_4\text{(s)} + 4\text{H}_2\text{(g)}$
D. None of the above
-  5. Balance the following reaction:
 $\text{Pb(NO}_3)_2\text{(s)} \rightarrow \text{PbO(s)} + \text{NO}_2\text{(g)} + \text{O}_2\text{(g)}$ (1M, 2009)
- A. $2\text{Pb(NO}_3)_2\text{(s)} \rightarrow 2\text{PbO(s)} + 4\text{NO}_2\text{(g)} + \text{O}_2\text{(g)}$
B. $\text{Pb(NO}_3)_2\text{(s)} \rightarrow 2\text{PbO(s)} + 4\text{NO}_2\text{(g)} + \text{O}_2\text{(g)}$
C. $2\text{Pb(NO}_3)_2\text{(s)} \rightarrow 2\text{PbO(s)} + 3\text{NO}_2\text{(g)} + \text{O}_2\text{(g)}$
D. None of the above
-  6. What are the products formed on strongly heating ferrous sulphate crystals. What type of chemical reaction occurs in this change? (2009, 1M)
- A. Ferric Dioxide, Sulphur Dioxide and Sulphur Trioxide
B. Ferric Oxide, Sulphur Dioxide and Sulphur Trioxide
C. Ferric Oxide, Sulphur Dioxide and Sulphur oxide
D. Ferric Oxide, Sulphur Dioxide and Ferrous sulphate

 7. What is the colour of ferrous sulphate crystals? (2009, 1M)
A. White B. Red
C. Yellow D. Green


 8. Calcium Oxide reacts vigorously with water to produce slaked lime.
$$\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2$$

This reaction can be classified as: (1M, 2010)

- (A) Combination Reaction (B) Exothermic Reaction
(C) Endothermic Reaction (D) Oxidation Reaction

Which of the following is the correct option:

- (a) (A) and (C) (b) (C) and (D)
(c) (A), (C) and (D) (d) (A) and (B)

 9. When hydrogen sulphide gas is passed through a blue solution of copper sulphate, a black precipitate of copper sulphide is obtained and the sulphuric acid so formed remains in the solution. The reaction is an example of : (1M, 2010)

- A. Combination Reaction
B. Displacement Reaction
C. Decomposition Reaction
D. Double Displacement Reaction

 10. In a double displacement reaction such as the reaction between sodium sulphate solution and barium chloride solution: (1M, 2020)


- (A) exchange of atoms takes place (C) exchange of ions takes place
(B) a precipitate is produced (D) an insoluble salt is produced

 The correct option is:


- (a). (B) and (D) (b). (A) and (C)
(c). only (B) (d). (B), (C) and (D)

 11. Photosynthesis is ? (2001, 1M)

- A. Endothermic B. Exothermic
C. Both A and B D. None of the above

 12. Copper vessels loose shine when exposed to air due to which reaction? (1M, 2017)


- A. $2\text{Cu} + \text{O}_2 \rightarrow \text{Cu}_2\text{O}$
- B. $\text{Cu} + \text{O}_2 \rightarrow \text{CuO}$
- C. $2\text{Cu} + \text{O}_2 \rightarrow 2\text{CuO}$
- D. None of the above

 13. State the type of chemical reaction used for the extraction of metals from their naturally occurring chlorides or oxides (2011, 1M)

- A. Endothermic Reaction
- B. Exothermic Reaction
- C. Electrolytic Reduction
- D. None of the above

 14. Silver articles become black after sometime when exposed to air due to which reaction? (2011, 1M)


- A. $\text{Ag (S)} + \text{H}_2\text{S (g)} \rightarrow \text{Ag}_2\text{S (s)} + \text{H}_2\text{(g)}$
- B. $\text{Ag (S)} + \text{H}_2\text{S (g)} \rightarrow \text{Ag}_2\text{S (s)} + \text{H}_2\text{(g)}$
- C. $\text{Ag (S)} + \text{H}_2\text{S (g)} \rightarrow \text{Ag}_2\text{S (s)} + \text{H (g)}$
- D. None of the above

 15. Mention the Colour of $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ crystals. (2012)


- A. blue-red
- B. blue-green
- C. black-green
- D. None of the above

 16. Balanced chemical equation for the change of colour of $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ upon heating . (2012)


- A. $2\text{FeSO}_4\text{(s)} \rightarrow \text{Fe}_2\text{O}_3\text{(s)} + \text{SO}_2\text{(g)} + \text{SO}_3\text{(g)}$
- B. $\text{FeSO}_4\text{(s)} \rightarrow \text{Fe}_2\text{O}_3\text{(s)} + \text{SO}_2\text{(g)} + \text{H}_2\text{SO}_4\text{(g)}$
- C. $2\text{FeSO}_4\text{(s)} \rightarrow \text{Fe}_2\text{O}_3\text{(s)} + \text{SO}_2\text{(g)} + \text{SO}_3\text{(g)} + \text{H}_2\text{O(l)}$
- D. None of the above

 17. What happens when an aqueous solution of sodium sulphate reacts with an aqueous solution of barium chloride? (2010)


- A. $\text{Na}_2\text{SO}_4\text{(aq)} + \text{BaCl}_2\text{(aq)} \rightarrow \text{BaSO}_4\text{(s)} + 2\text{NaCl(aq)}$
- B. $\text{Na}_2\text{SO}_4\text{(aq)} + \text{BaCl}_2\text{(aq)} \rightarrow \text{BaSO}_4\text{(s)} + 2\text{NaCl(aq)}$
- C. $\text{Na}_2\text{SO}_4\text{(aq)} + \text{Ba}_2\text{Cl(aq)} \rightarrow \text{BaSO}_4\text{(s)} + 2\text{NaCl(aq)}$
- D. None of the above

 18. On heating 2g of lead nitrate powder in a boiling tube, emission of brown fumes of nitrogen dioxide is observed, this is an example of which type of reaction? (2008)

- A. Electrolysis
- B. Displacement
- C. Decomposition
- D. None of the above

 19. A silver article generally turns black when kept in the open for a few days. Name the black substance formed and the chemical reaction involved. (2008)


- A. Hydrogen Sulphide, $\text{Ag} + \text{H}_2\text{S} \rightarrow \text{Ag}_2\text{S} + \text{H}_2\text{S}$
- B. Silver sulphide, $\text{Ag} + \text{H}_2\text{S} \rightarrow \text{Ag}_2\text{S} + \text{H}_2$
- C. Hydrogen, $\text{Ag} + \text{H}_2\text{S} \rightarrow \text{Ag}_2\text{S} + \text{H}_2$
- D. Silver sulphide, $\text{Ag} + \text{H}_2\text{S} \rightarrow \text{Ag}_2\text{S} + \text{H}_2$

 20. Zinc reacts with silver nitrate to produce zinc nitrate and silver. Give the chemical reaction and its type. (2019)

- A. $\text{Zn(s)} + 2\text{AgNO}_3(\text{s}) \rightarrow \text{Zn(NO}_3)_2 + 2\text{Ag}$, Decomposition Reaction
- B. $\text{Zn(s)} + 2\text{AgNO}_3(\text{s}) \rightarrow \text{Zn(NO}_3)_2 + 2\text{Ag}$, Displacement Reaction
- C. $\text{Zn(s)} + \text{AgNO}_3(\text{s}) \rightarrow \text{Zn(NO}_3)_2 + \text{Ag}$, Displacement Reaction
- D. $\text{Zn(s)} + 2\text{AgNO}_3(\text{s}) \rightarrow \text{Zn(NO}_3)_2 + 2\text{Ag}$, Decomposition Reaction

 21. Potassium iodide reacts with lead nitrate to produce potassium nitrate and lead iodide. (2019)

- A. $\text{Pb(NO}_3)_2 + 2\text{KI} \rightarrow \text{PbI}_2 + 2\text{KNO}_3$, Decomposition Reaction
- B. $\text{Pb(NO}_3)_2 + 2\text{KI} \rightarrow \text{PbI}_2 + 2\text{KNO}_3$, Double Displacement Reaction
- C. $\text{Pb(NO}_3)_2 + 2\text{KI} \rightarrow \text{PbI}_2 + 2\text{KNO}_3$, Double Displacement Reaction
- D. None of the mentioned

 22. No chemical reaction takes place when granules of a solid, A, are mixed with the powder of another solid, B. However, when the mixture is heated, a reaction takes place between its components. One of the products, C, is a metal and settles down in the molten state while the other product, D floats over it. It was observed that the reaction is highly exothermic. (2010)

(i) Based on the given information make an assumption about A and B and write a chemical equation for the chemical reaction indicating the conditions of reaction, physical state of reactants and products and thermal status of reaction.

- A. $\text{Fe}_2\text{O}_3(\text{s}) + 2\text{Al(s)} \rightarrow 2\text{Fe(l)} + \text{Al}_2\text{O}_3(\text{s}) + \text{Heat}$
- B. $\text{Fe}_2\text{O}_3(\text{s}) + 2\text{Al(s)} \rightarrow 2\text{Fe(l)} + \text{Al}_2\text{O}_3(\text{s}) + \text{Heat}$
- C. $\text{Fe}_2\text{O}_3(\text{l}) + 2\text{Al(s)} \rightarrow 2\text{Fe(l)} + \text{Al}_2\text{O}_3(\text{s}) + \text{Heat}$
- D. $\text{Fe}_2\text{O}_3(\text{s}) + 2\text{Al(s)} \rightarrow 2\text{Fe(s)} + \text{Al}_2\text{O}_3(\text{s}) + \text{Heat}$

(ii) Type of reaction under which above chemical reaction can be classified?

- A. Displacement
- B. Oxidation-Reduction
- C. Redox Reaction
- D. All of the above



- A. Surface Decomposition
C. Surface Oxidation.



- A. $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2$, $\text{Ca}(\text{OH})_2 + \text{CO}_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}$
 B. $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2$, $\text{Ca}(\text{OH})_2 + \text{CO}_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}$
 C. $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2$, $\text{Ca}(\text{OH})_2 + \text{CO}_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}$
 D. None of the mentioned



- A. $2\text{AgCl (sunlight)} \rightarrow 2\text{Ag} + \text{Cl}_2$
 B. $2\text{AgBr (sunlight)} \rightarrow 2\text{Ag} + \text{Br}_2$
 C. Both A and B
 D. None of the mentioned



Answer- The process in which new substances with new properties are formed by the rearrangement of atoms is known as a chemical reaction. (2017,5M)

- Change in
 - (i) Colour eg: $\text{Fe} + \text{CuSO}_4 \text{ (blue)} \longrightarrow \text{FeSO}_4 \text{ (Blue Green)} + \text{Cu}$
 - (ii) Temperature eg: $\text{CaO} + \text{H}_2\text{O} \longrightarrow \text{Ca(OH)}_2 + \text{Heat}$
 - (iii) State eg: $\text{H}_2\text{(g)} + \text{O}_2\text{(g)} \longrightarrow \text{H}_2\text{O(l)}$
- Evolution of gas: eg: $\text{Zn(s)} + \text{H}_2\text{SO}_4 \text{ (aq)} \longrightarrow \text{ZnSO}_4\text{(aq)} + \text{H}_2\text{(g)}$
- Formation of precipitate:
 - eg: $\text{Pb(NO}_3)_2 \text{ (aq)} + \text{KI (aq)} \longrightarrow \text{PbI}_2\text{(s)} + \text{KNO}_3\text{(aq)}$
(yellow solid ppt)



- (i) Digestion of food in our body
- (ii) Rusting of Iron
- (iii) Heating of manganese dioxide with aluminium powder
- (iv) Blue colour of copper sulphate solution disappears when iron filings are added to it
- (v) Dil. HCl acid is added to sodium hydroxide solution to form sodium chloride and water.

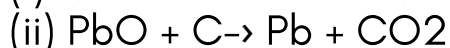
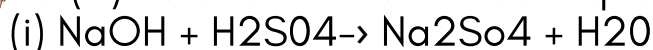
Answer: The chemical reactions in the statement are :

- (i) Decomposition Reaction Carbohydrates are broken down to form glucose as by-product.
- (ii) Oxidation Reaction-When an iron object is left in moist air for a few days or week, it gets a layer of a red-brown flaky substance called rust.
- (iii) Displacement reaction In this More reactive metal displaces less reactive metal from its salt solution.
- (iv) Displacement reaction In this More reactive metal displaces less reactive metal from its salt solution.
- (v) Double displacement reaction In this reaction, two compounds react by an exchange of ions to form two new compounds.

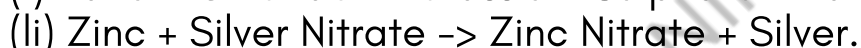
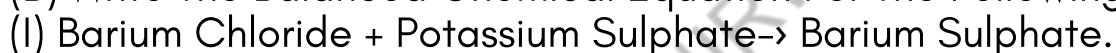


28.(A) Balance The Chemical Equation:

(2016,5M)



(B) Write The Balanced Chemical Equation For The Following Reaction:



Answer: (A)



(B)



29. (A) Illustrate An Activity, To Show That A Change In The State Of Matter And Change In Temperature Take Place During A Chemical Reaction.

(B) Write Balanced Chemical Equation For The Following Reaction:

(I) Natural Gas Burns And Combines With Oxygen To Produce Carbon Dioxide And Water.

(II) Ferrous Sulphate Crystals On Heating Break Up Into Ferric Oxide, Sulphur Dioxide And Sulphur Trioxide. (5M, 2015)

Answer -

(A) Take about 5kg of quicklime in a beaker and add to it about 50 ml of water. A brisk reaction takes place and a lot of heat is evolved.



Quick lime is a white solid but after the reaction, calcium hydroxide is formed which is soluble in water and a clear solution is obtained. Thus, there has been a change in state of matter and change in temperature.

(B)



PYQ MCQ ANSWERS:

1. B
2. C
3. A
4. C
5. A
6. B
7. A
8. D
9. D
10. D
11. A
12. C
13. C
14. B
15. B
16. A
17. B
18. C
19. B
20. B
21. C
22. i- A ii- D
23. C
24. C
25. C